Theory on the physical and mathematical Sets

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SETS of elements: Classes, types and operations.

This is a study of mathematical adaptation for my works on metaphysic of 1995, **although I try to establish it as system of characteristics and properties of the physical and mathematical sets.**
This theory doesn't try to substitute or compete against the current set theory, but introducing new concepts, field of application and mathematics operations.

Sets are groupings of elements, question that gives them their character, properties and mainly their functionality, reason for which I contemplate the empty sets as summary alone.
The class and type of sets can belong to very different nature, but for this study I only will take in mind the types and class that satisfy to this proposal of study where the main foundations are the relation among their constituent elements:
So, in this way I propose the following classification:

--CLASS of sets and elements
--ANALOGY among the elements.
--TYPES of CONVERGENCE,
--RESULTANT CHARACTERISTICS.

CLASSES

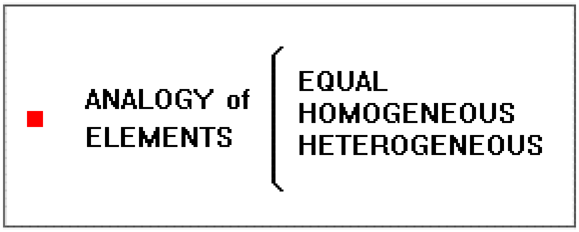
This theory understands that:

"Class is the denomination of any set that is made in base to the peculiarities and characteristic of its elements as well as of the requirements and demands that we request to these elements to be integrated in the set."
The class of set depends therefore on its elements and on the specific demands to form this set.
We will have this way a set of letters, numbers, musical notes, flowers, books, etc.
But we also can demand to the elements characteristics and special requirements to form set, as it can be for example:
Set of yellow flowers; set of mature apples and with worm; set of bald mans with moustache; set of trees with jagged leaves, etc.

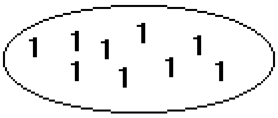
All these classes of sets, as we see, are defined by their name and linguistic expression.
But, as the denomination and diversity of classes of elements that can constitute a set it is almost limitless and diverse, and the same time the demands and requirements to form group are also limitless, because with alone taking in mind their class it is not enough to study set in a structured and organized way.
For example, if we observe an apple, to this we can include it in many different sets as they can be: A set of apples, set of fruits, set of vegetables, set of things, etc; a set of green apples, of mature apples, of small apples, etc.
All they can contain to our apple, but they are very different set some of others.
So it would be necessary to look for other parameters to study the types of elements of sets apart from their class.
For it, we look for other characteristics, as those previously exposed.

ANALOGY: As for the characteristics of the component elements

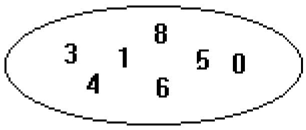
Regarding the ANALOGY or similarity of the elements of any set, these can be:
---EQUAL
---HOMOGENEOUS
---HETEROGENEOUS.



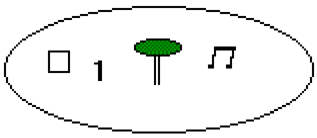
They are EQUAL, as their name says, when all they have the same form, structures, class, etc. that is to say, they are same all their elements.



They are HOMOGENEOUS elements, when not being completely equal although they belong to the same type, form or similitude.



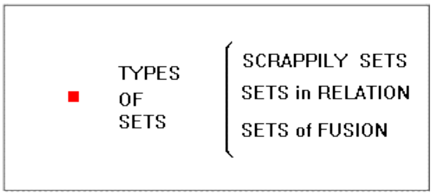
They are HETEROGENEOUS elements, when they are completely different.



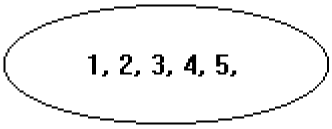
TYPES: Type of inter-relation among elements.

As for the TYPE of sets I will divide them in:

---- SCRAPPILY SETS
---- SETS in RELATIONSHIP
---- SETS in FUSION



--They will be SCRAPPILY SETS when their elements in spite of being united forming group, they don't have any relationship type or understanding among them.
--They will be SETS in RELATION when the elements or subsets that form them are united among them with any type of relation or coordination.
--They will be SETS in FUSION when their elements unite closely forming with this union some new elements, usually, with different properties to of their components.
In the sets of Relation and/or Fusion it is very interesting to know what it is the relationship type that unites them because this relation gives them the decisive properties as set.
So it is not enough with saying that it is a relationship or fusion set, but rather the important thing is of defining in all moment the relationship class that unites them, in such a way that, in general, the component elements losses their own definition to acquire the name of the relationship and many times the resulting body that conform this set.
Examples:
With name of bodies:
--Brain, but not group of neurons in relationship.
--Mind, but not groups of sense-intelligent elements.
--Automobile, but not group of mechanical pieces.
With relationship types:
Mathematical succession,



But as I have said, in sets we can observe the quality or characteristic of the resultant body, which will be the character and properties that any set takes for the reason of the conjunction and coordination of its elements.
In the case of an automobile, the resultant set in the coordinated assembling of all the pieces of the same one give us a body with all the properties and characteristics that we know, to which we already give its appropriate noun: Automobile.
The same, an animal is a set with a great relationship among their elements forming a body of biochemical type with some quite creative and spectacular resulting characteristics.

---- SCRAPPILY SETS

The cohesion and relation of the elements of a set can give us the distinct categories in which we can divide and call to the different sets of elements.
This way, scrappily sets will those that have very little cohesion among them.
As examples of this, we can consider those such as:
Accumulation of stones, screws, balls, etc.; baskets of apples, pears, etc.; any set of number without any mathematical relation, etc.

---- SETS in RELATION

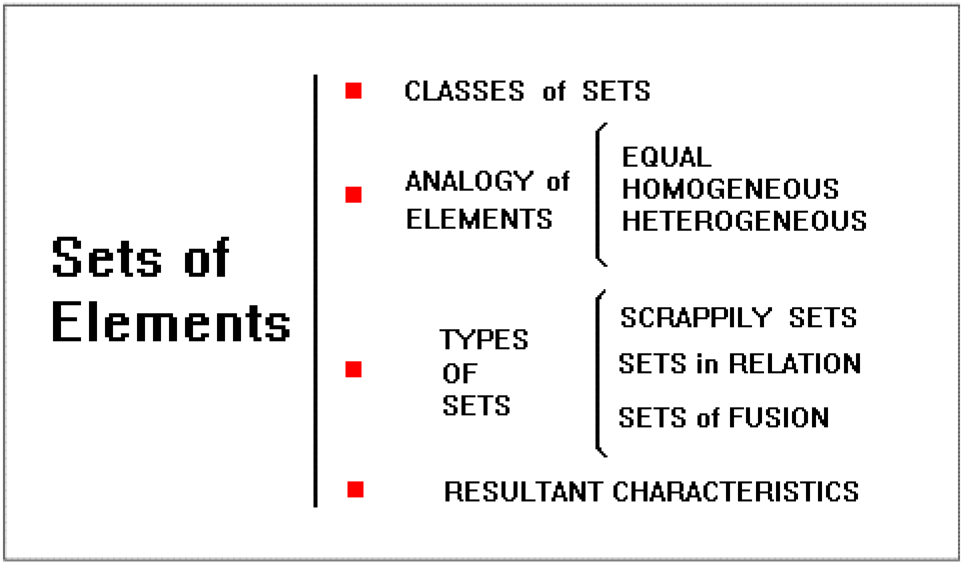
In this case, la relation and cohesion is much bigger than in the anterior case.
The elements of a set in relation have clear rules of union among them with which the resultant set acquires especial characteristics as group.
With object of distinguishing between sets of fusion and set in relation (It has certain difficulty) we can say:
"In the set of relation the component elements can be clearly distinguished, while in the fusion sets the component elements canâ€™t be distinguished in any case, and alone we can observe the resultant body".
Example of Set in Relation could be a mathematical succession (1, 2, 3, 4, 5, etc.) whose elements or numbers are interrelated or they communicate among them by means of a logical composition or a mathematical valuation, in definitive by means of an intelligent structuring.
Other ones could be: any mathematic operation 12 X 12 = 144; a bookcase with bottles; a closet with their orderly clothes; a military parade; etc.
But also we can consider sets in relation to many sets of fusion if we desire observe them alone from a particular y subjective point of view as for example when we observe a tree y consider alone their branch, leaves and fruits.

---- SETS in FUSION

In the Sets in Fusion their elements can't be observed normally.
Against in the Sets in Fusion the group of elements forms so very organized and structured set that acquires news and differential properties.
In this case, these properties and characteristics make this set to take its own noun as set, and much more, these sets take the general noun of "physics or mathematical **Bodies".**

As examples of Sets of Fusion we could put to most of the physical bodies of the nature in which, their constituent elements are not clearly reflected but their resulting physical bodies.
We would have this way as examples to any tree, an animal, an egg, an automobile, the sea, the sun, etc. etc.

Therefore and summarizing, from the observation and study of the sets we can define the following square:



Resultant characteristics

Logically each set when containing different elements and with different cohesion and relationship among them, because it gives it some characteristics and particular properties.
And in fact these characteristics and properties are those that give valuation and distinction as set.
In this case if we observe sets attentively, we see when bigger index of cohesion and understanding among their elements--bigger index of distinction, specialization and valuation as set of elements.
Therefore, for general norm any set of fusion will have higher own status and bigger distinction that a simple scrappily set, in which its elements don't contribute to any type of interior construction that can provide it any distinction and character.
In the same way, the denomination of the fusion sets as physical or mathematical **Bodies** with their own name, already defines us their importance, valuation and consistency as sets.
Therefore the resulting characteristics of the union of elements in sets give them their consistency and quality as group of elements, as well as, its own definition and structuring.

Convergence: Index

A transportable and common parameter between sets and chaotic systems is the **convergence** parameter among the elements that intervene in both systems.
We already saw in my cosmic model that chaos changes, solves or we can be measured by means of the convergence among the elements that intervene.
In the same way, the convergence is a parameter to measure the index of cohesion among the elements of a set.
So, convergence and cohesion are therefore synonyms.
Because well, we have used in this theory three convergence levels for sets (scrappily, sets in relationship and fusion sets), nevertheless in later studies maybe we see that it can also be useful to propose a convergence index in percentage.
As the convergence it is a parameter subject to consideration and measure, because we will use an index that values us if much or little convergence among the elements of a set exists.
In the case of sets we will use a valuation for the convergence index in percentage from 0 % to 100 % .
This way for example, in a scrappily set (i.e. heap of stones) we will use 0 % as convergence, and in a set of complete fusion (an animal) we will use 100% as convergence among their elements (atoms, molecules, organs, etc.).

This convergence index is interesting because it can say us some peculiarities and circumstances in sets.
For example, we can observe two set with equal elements, but one could be a scrappily set and the other one could be a fusion set.
(For instance, if we observe a heap with all the component pieces of an automobile, and later on, we observe the automobile already assembled and circulating for the road.)
In the first place, we are observing a scrappily set. In the second place, we are observing a fusion set.

Pure mathematics and mathematics of sets

In fact the pure mathematics is mathematics of sets since its mission is the one of considering, adjust and manipulate units and sets of values to give us solves numeric resultants that continue being sets solutions although they are eminently numeric.
Therefore what happens in the pure mathematics it is we abstract from of physical reality of the elements to adjust alone their numeric value.
Nevertheless if at the end we don't apply and makes some correspondence among the mathematics values and their real application on the physical elements, then all the theorems and mathematical solutions would not have enough reason of being. Its practice in the physical elements is what gives it real value.
Now well, it is here where the mathematics of sets begins to have value and consistency. When it is kept in mind for the resolution and adjustment of operations in the physical sets so much the mathematical operability as the consistency and peculiarities of these sets and their elements.
Therefore in the mathematics of sets, we must adjust their values but we must also respect their forms of union, structuring, interrelation, etc., for not destroy their characteristic and to make that the mathematical results are faithful to the structural results of these sets.
Now then, respecting and following the structural ways of sets, the mathematics can arrive to all and each one of the numeric adjustments of these.
So, due to this reason, it is necessary a new mathematical theory of sets that embraces all the traditional mathematical operations, but adapted to the physical reality of the elements.
And this is what tries to develop this physical and mathematical theory of sets:
To study, manage and adjust to the physical sets of elements, but making that the norms and mathematical operations follow a line of respect of the practical real adjustment of all the circumstance of sets and their elements.
Therefore following and accompanying mathematically to sets in their characters, unions, interrelations, transformations, compositions, etc., without losing of view none of these peculiarities of sets.
En the same way, this theory studies and theorizes about the different circumstances, transformations, interrelation, properties, etc., of sets with object of a complete comprehension and study on the sets of elements.

Own elements and intersection elements

[*] A question very important in this theory (which differs clearly of the current one) is that:
As principle, any set has different elements than other ones, although they could have the same appearance.
When any element is an intersection element, then we have to expose it (underlining it) with object of not confuse us in operations.
When any intersection element is present in any sets, we must to express it so.

Current sets theory.

In this sense I understand that a basic error in the current theory is to presuppose that alone a single element of each type exists in the Universe (alone one 1, alone one 2, alone one a, one b, an apple, a pear, etc. etc.).
To difference my theory accepts that infinite similar elements can exist in the Universe, (infinites 1, infinites 2, infinite a, infinite b, infinite apples, infinite pears, etc. etc.).
Therefore it is set as principle that all the sets have different elements (although they seem equals).
But when intersection elements exist in any set (elements that belong at the same time to two o more sets), this case we have to express it as we see later.

Examples of this would be:
--The operation of the current theory would tell us that if we have a box A with 1700 euros and another box B also with 1700 euros, and we unite them, the new resulting set AuB would continue having 1700 euros, because the current theory confuses the physical reality with the appearance of the elements.

A (1700 euros) union to B (1700 euros) = AuB (1700 euros)

--If we have a bag A with a pear and an apple A(pear, apple) and another bag B with another pear and another apple B(pear, apple) their union would give us a resulting set AuB with alone a pear and an apple.

A (pear, apple) union to B (pear, apple) = AuB (pear, apple)

As we see the current theory it is not operative.

My theory will give us that:

A + B (pear, pear, apple, apple) or A + B (2pear, 2apple)

So my theory proposes small changes of principles to be able to operate appropriately with sets as we see later on.

For example:
Given two different sets A (a,b,c,d,e,) and B (a,d,h,j,k) we have that any of their elements are different, then their union have to be A + B (a,b,c,d,e,a,d,h,j,k)
--But if any element is an intersection element among both sets, we must to express it underlining it. (a,b,c,d)
Given two intersection sets A (a,c,d,h,k,1,2) and B (a,c,d,h,l,j,1,2,) where (c,d) are elements of intersection (and belonging to A and B), then we must to expose it.
This case the union of A and B could be A + B (a,c,d,h,k,1,2,a,h,l,j,1,2).

** This type of consideration is taken to be possible an adequate method in operations.

Comparison of Sets

When we bring near to compare two sets, we can observe different degrees of likeness among them.
These degrees of likeness can identify them by means of the use of different levels of similarity, to which I could qualify as:

----IDENTICAL
----EQUAL
----HOMOGENEOUS
----HETEROGENEOUS
----CONVERGENT

----IDENTICAL

Sets would be identical among them, when they complete two demands:
1.- They must to have the same elements.
“Given two sets A and B, in which each element of A has other identical in B, and each element of B has other identical in A.”
2.- They must to have the same convergence, that is to say, any rule of cohesion, ordination and any clustering norm is given in both groups at the same level.
Therefore they must be two indistinguishable sets one of the other one.
To represent identical sets we can use the sign ><

This way, A >< B tells us that the sets A is identical to the set B and vice versa.

A (road) >< B (road) are identical
but A (road) >/< B (road) are not identical

As examples we can put:
-A set in relation as it could be a box A of whisky bottles and next to it another box B in equals conditions and mark.
-A fusion sets as it could be an automobile recently left from the factory and next to it another automobile equal in model and characteristic.

Arrived to this point, I could establish a concept of certain importance in Sets, which it would be their IDENTITY.

IDENTITY would be, as we have seen, the totality of characteristic and particularities of any set, including its elements, convergence, etc., that is to say, everything that makes it specific and different from others.

----EQUAL

Two o more sets are equal among them when they have the same elements.
Therefore to be equal sets they alone have to complete the first premise of the identical sets, which is: "Given two sets A and B, in which each element of A has other identical in B, and each element of B has other identical in A."
In this case the compared sets can be differentiated for the way of clustering or order of their elements, but not for the elements that compose them, which have to be identical.

This way, A = B tells us that the sets A is equal to the set B and vice versa.

A (road) >< B (road) are identical
A (road) = B (rado) are equal, but not identical

As example we can put:
-The example of the whisky bottles, when comparing the box of bottles A with another box B but already with the bottles taken out and disordered.
-Or the comparison of two numeric successions (1, 2, 3, 4, 5) and (5, 4, 3, 2, 1)

----HOMOGENEOUS

To be homogeneous sets among them it is enough when their elements belong to the same gender, type, character, etc.
Given two sets A (1,2,6,8,9,) and B (9,4,5) they are homogeneous to be number all their elements.
Given two sets A (a,b,c,d,e,) and B (1,5,7,9,3) they are not homogeneous to be their element belonging to different gender o class (number and letters)

In this case we could put as example:
-A basket of hen eggs, next to a basket of duck eggs. They would be homogeneous with relationship to the character or term "egg."

----HETEROGENEOUS

Two sets A and B are heterogeneous comparatively when their elements belong to different gender, class, etc. and at the same time they don't have any type of convergence.

Given two sets A (a,h,c,x,e,) and B (7,5,1,9,3) they are heterogeneous to be their element belonging to different gender o class (number and letters)

----CONVERGENT

Two sets A and B are convergent when having heterogeneous elements they keep the same classification, organization o convergence.
As example of it, we can put as set A a parade of soldiers circulating for an avenue, and as set B a squadron of airplanes flying over them in the same sense and with the same purpose.

Operations with Sets

In operations with sets, this study differs in several points regarding the current theory when understanding that the current theory don't explain correctly the real circumstances in sets.
In any others points, this theory agrees.
In these last cases I will revise these operations at the end.

Sums of sets.

Two sets can be added by means of the union of all their elements in a single set, with the two following conditions:
1.- First condition: All the elements of the constituent sets will be in the new formed super-set.
2.- Second condition: All the elements have to continue their convergence, peculiarities or identity that each one of them had.
This way, when the constituent sets have the same rules of convergence, and if it were possible, the new super-set should be built following these rules of convergence.
For instance:
Given a set A (6,7,8,9) or continue succession and a set B (1,2,3,4,5,) that is also a succession, this case it is possible that the resulting super-set is built as a continue succession A + B (1,2,3,4,5,6,7,8,9).
Examples of sum of sets:
----If we sum a given set A, formed by several numbers without ordering (6 7 3 1 4 7) with a given set B also formed by number without ordering (5 9 2 1 4), the resulting super-set will contain all and each one of the elements or number before mentioned, also without ordering, A + B (7 7 1 3 2 9 1 4 4 5 6) or any other one that contains all these elements.
----If we sum a Set A (23-14=9) that is constituted by elements of a mathematical operation with a set B (33x2=66) also formed by a mathematical operation, the resulting super-set A + B (23-14=9 33x2=66) will have to contain all the elements of the two groups and at the same time to conserve their identity or convergence.
----If we sum a set A (whisky bottles box) to a set B (three loose oranges), in the resulting super-set A + B (the whisky box will be intact and the oranges will be been able to place in any position inside this super-set since before oranges neither had any ordination)
Nevertheless, if the oranges were orderly inside a bag, they will also be ordered in their bag in the new super-set.

Subtraction of sets.

Subtract principle:

"Given a set A, we can subtract or extract it one or several subsets (*B,C,D*) or elements (a,b,c) from the same one.
Or all its elements, becoming in this in case an empty set."

Therefore here it is necessary to establish clearly the distinction among the subsets (*B,C,D,E,F*, etc.) all them belonging to the main set A from which are subtracted, apart from other different groups B,C,D etc. that don't belong to the set A, and therefore, they cannot be subtracted from A.
"From any set A it is not possible subtract elements of any different set, alone the element that the set A has".
It would be then the following expression:

A -- *B* where *B* must to be always a subset belonging to A.

And when there are several subsets to subtract we can put:

A -- (*B* + *C* + *D* + *E* ...)

Therefore the principle of the subtraction should be completed in such a way that the set A has as components to the subsets to subtract *B*, *C*, *D*, *E*.
And we will express it this way:

A (*B*, *C*, *D*, *E*) The set A contains to the subsets (*B*, *C*, *D*, *E*) that can be subtracted.

For instance:
--If we have a set A (composed by two pears and three apples) we can subtract it the subset *B* (formed by two pears).
But we cannot subtract it two pears belonging to another set B.

A (2 pears, 3 apples) -- *B* (2 pears) = A -- *B* (3 apples)

--If we have a set A (2,4,6,8,0) we can subtract it its subset B (8,0) and it will be a set A -- *B* (2,4,6).

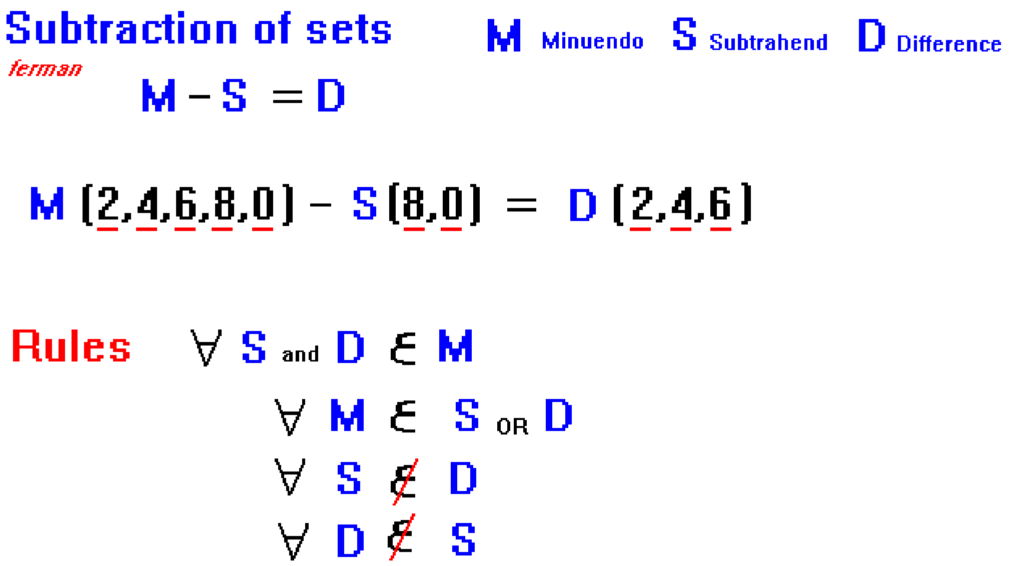
A (2,4,6,8,0) -- *B* (8,0) = A -- *B* (2,4,6)

This way, any subtraction must to complete the rule of the total intersection among all the elements of its parameters, say:

minuend = subtrahend + difference, where

---All the subtrahend and difference elements were in the minuend.
---All the minuend elements must to be in the subtrahend OR difference.
---None element of the subtrahend is in the difference.
---None element of the difference is in the subtrahend.

A (2,4,6,8,0) -- B (8,0) = A -- B (2,4,6)



** The same that in other operations, so that the subtraction is pure and don't represent a composition, the premise of the conservation of the convergence in the resulting sets of this subtraction should also be respected.

Multiplication of sets by a number or function

The product of a set by a number or numeric function will consist on another resulting-set formed by the product of each one of the elements of the primary set by the number or function.

For instance:
Given a set A (a,b,c,d,) that is multiplied by the number 3.
The real resulting-set will be 3xA (a,a,a,b,b,b,c,c,c,d,d,d,).
Nevertheless it is allowed to represent it in form of mathematical synthesis and put it in the form 3xA (3a,3b,3c,3d).
In the same way that in sum, for the product of a set by a number, it is necessary to conserve the identity or convergence in the result.

For instance:
Given a set A (a,b,c,coco,%) to which we multiply by the number 2. The real result would be 2xA (a,a,b,b,c,c,coco,coco,%%) or its mathematical representation (2a,2b,2c,2coco,2%).
When it is a mathematical function and while we don't have the result of this function, the resulting-set will have to express it only in mathematical representation.
Then when we have the result of the function, we can already make a real representation of the resulting-set.

For example:
Given a set A (a,b,c,coco) multiplied by a function y=2x.
In this case we would have to represent mathematically to the resulting-set as Axy (ya,yb,yc,ycoco) or as Ax2x (2xa,2xb,2xc,2xcoco), but we won't be able to expose all their real elements until we don't know the solution of the function.
In the case of multiplication of set by numbers or functions, and when it is possible, it is advisable to follow the norms of identity or convergence that had the multiplied set, in such way that we can structure in a single organized group all their elements.

For example:
Given a set A that is formed by 12 posts orderly situated on the edge of a highway.
If we multiply this set for the number 3, it would give us a set 3xA formed by 36 posts, orderly located along the edge of the highway.

A (12 posts) x 3 = 3xA (36 posts) in this case, orderly situated.

So this case, the convergence of the set is also respected in the resulting-set.

The operations with sets can be very used in the practice.
As example of these operations I could put the following one:
If in the militia (for example) we want to form a battalion to carry out a specific mission, which we desire consists of six companies perfectly equipped for the mission to develop, because we would proceed to choose and to study a company type according to the necessities, and subsequently to train or to prepare them for unite them later to form the battalion.
In this case we could put it as product of a set A (company) multiplied by a number (6) to which we add another command set B (colonel, 2 commandants).
It would be us then:

A (company) x 6 + B (colonel, 2comandantes) = battalion C (colonel, 2comandantes, 6 companies).

We also could include detail of the companies, soldiers, intermediate commands, etc., even armament and utensils if we want to include them.
Everything it by means of these procedures of sum and products, that is to say, using normal mathematical procedures but by means of sets where their characteristics and peculiarities are conserved.

Algebraic product of sets. ---- (Highlights)

This theory on the physical and mathematical sets understands that if we want to consider the products of sets of elements, we should come closer to the principles and properties of the multiplication of numbers, but respecting the properties of the elements of each set.
For it, I begin with some definition and exposition of the main structural parameters of the algebraic product among sets.

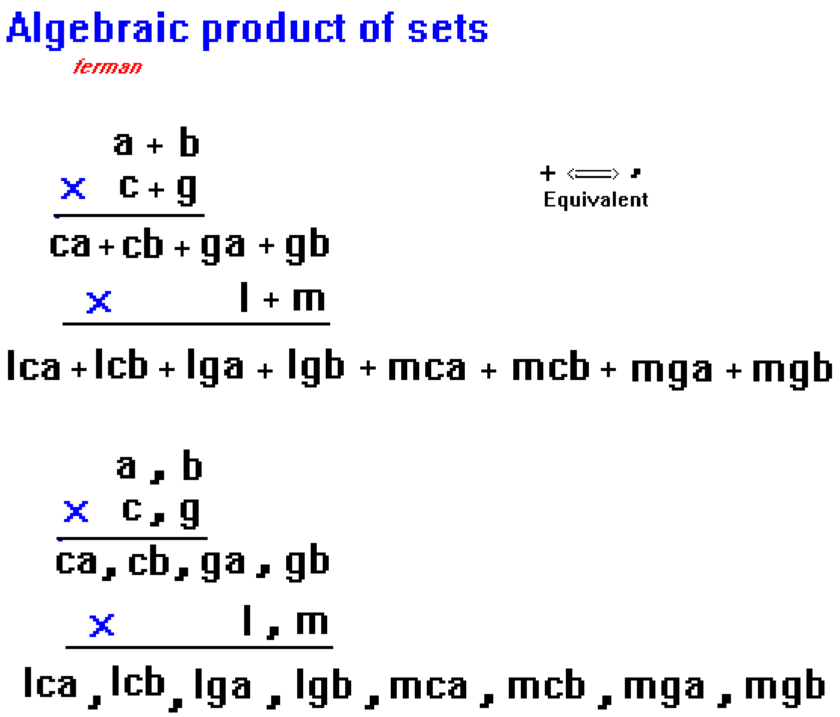
The algebraic product of sets in multiplication of the same ones following the common algebraic rules consists.

When being sets formed by elements of any type and entity, we will consider two types of components in the factors to multiply:

--The proper elements of the set, that can be of any type and entity.
(For example: a pencil, a tree, an animal, a sign, a symbol, an idea, a feeling, etc.)

-- The multiplier coefficients, or quantity of these previous elements that can contain each one of the factors to multiply.
(For example: 25 rabbits, being 25 the multiplier coefficient of the elements of the set, say, rabbits)

Now well, as we will see later on in the algebraic product of sets, the coefficients and quantities multiply between them and the elements are integrated (fused) among them.



But let us begin to revise the algebraic form of the products of sets.

Given two sets of variable elements A (a, b) and B (x, y) we can multiply them as if they were numbers:

A x B = (a, b) x (x, y) = AB (ya, yb, xa, xb)

And later to this result we can multiply it by another set C (d, e)

AB (ya, yb, xa, xb) x C (d, e) = ABC (eya, eyb, exa, exb, dya, dyb, dxa, dxb)

As we see, the product between the set of elements takes INTEGRATION character, when in each operative act, the multiplier factors fuse in a single element, to which we call INTEGRATED FACTOR.
In the previous example when we multiply **y . a** the integrated factor will be the result **ya.**

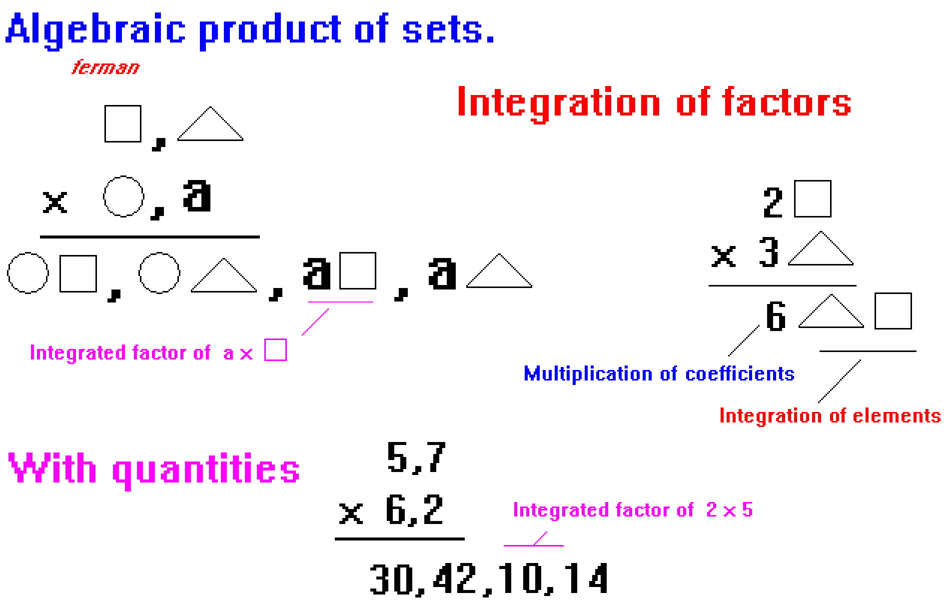
Now then, in the algebraic product of sets, anyone of these variables can be substituted by a number or by an element:

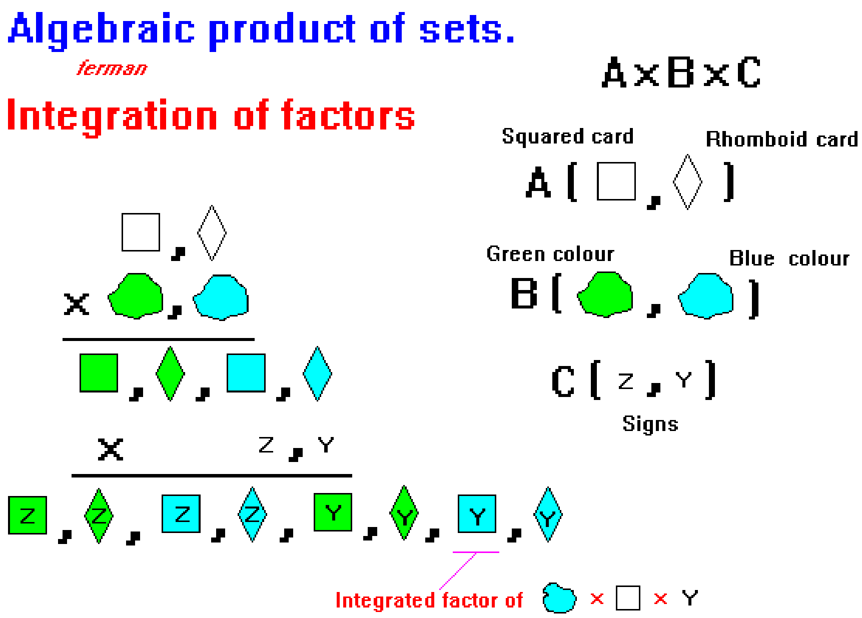
When it is by a number, the operations are already well-known in mathematics:

A x B = (6, 4) x (3, 2) = AB (2x6, 2x4, 3x6, 3x4) = AB (12, 8, 18, 12)

But if the factors of the multiplication are physical elements, then the resulting elements of the INTEGRATION will be formed by the physical union of the elements of each operative act into a compound element.
For example:

A x B = (@, &) x (#, %) = AB (%@, %&, #@, #&)





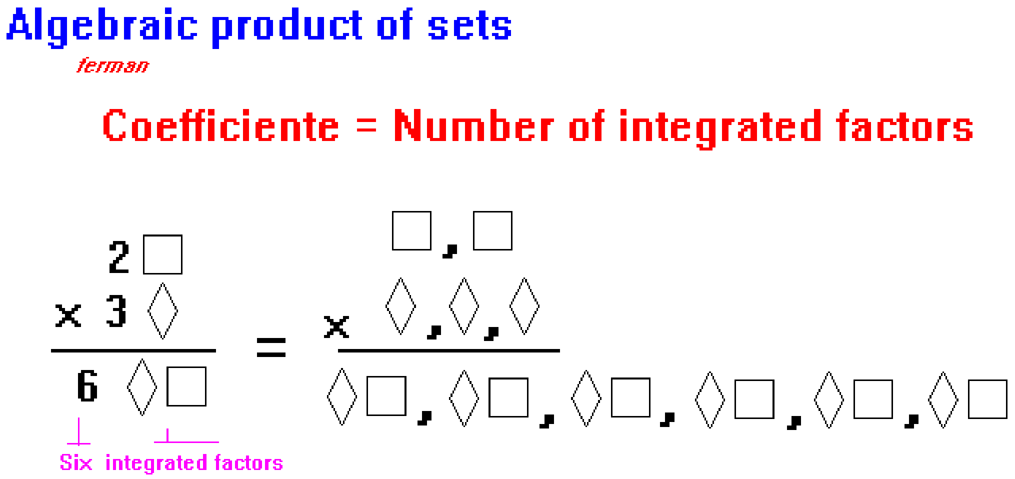
Coefficients and elements

In the multiplication of sets of elements we should distinguish between the physical (or symbolic, metaphysical, etc.) elements and the multiplier coefficients of these elements.
In a set A (5 rabbits, 4 bottles) can have physical elements (rabbits and bottles) and coefficients that express the quantity of these elements (5 and 4).
Although, the coefficients always multiply in each operative act as well their own elements, as to the elements of the other factors.
For example:

A (5 rabbits, 4 bottles) and B (2 boxes, 3 shelves)

A x B = (5 rabbits, 4 bottles) x (2 boxes, 3 shelves) = AB (15 shelf-rabbit, 12 shelf-bottle, 10 box-rabbit, 8 box-bottle)

That means that there will be:
--15 Integrated factors (o subsets), each one of them formed by a rabbit with shelf.
--12 Integrated factors (o subsets), each one of them formed by a shelf with bottle.
--10 Integrated factors (o subsets), each one of them formed by a rabbit in its box.
---8 Integrated factors (o subsets), each one of them formed by a box with bottle.



Quantity of resultant subsets

As we can see in the examples, the quantity of subsets or resulting integrated factors of any multiplication among sets of elements, is the product among the total number of elements of each multiplier sets.
In the example:

A x B = (5 rabbits, 4 bottles) x (2 boxes, 3 shelves)

A x B = (5 + 4 = 9) x (2 + 3 = 5)

A x B = 5 x 9 = 45 subsets of integrated factors.

Multiplication of sets of elements

INTEGRATION of factors and Number N of resultant factors

$$\begin{array}{r} a + b \\ \times \quad c + g \\ \hline ca + cb + ga + gb \\ \times \qquad l + m \\ \hline \end{array}$$

$$lca + lcb + lga + lgb + mca + mcb + mga + mgb$$

Integrated factor

n = 2

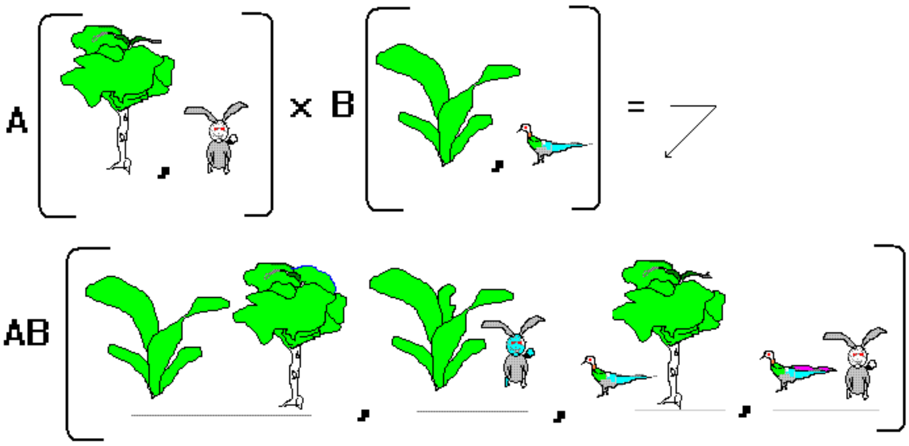
A [a,b]
B [c, g]
C [l , m]

+ ⟺ ,
Equivalent

$N = n \times n \times n \ldots..$

$N = 2 \times 2 \times 2 = 8$

Algebraic product of sets *ferman*



Multiple element: (x e)

Sometime we could operate with sets of elements as if they were a single one for the goal of obtaining results more appropriate for us.
For example, if we want to nail five nails in a wood, we cannot multiply the wood for the five nails as separate elements, due to this case the result give us five wood with a nail each one.

A (wood) x B (5 nails) = Wood x 5 nails = 5 wood-nail

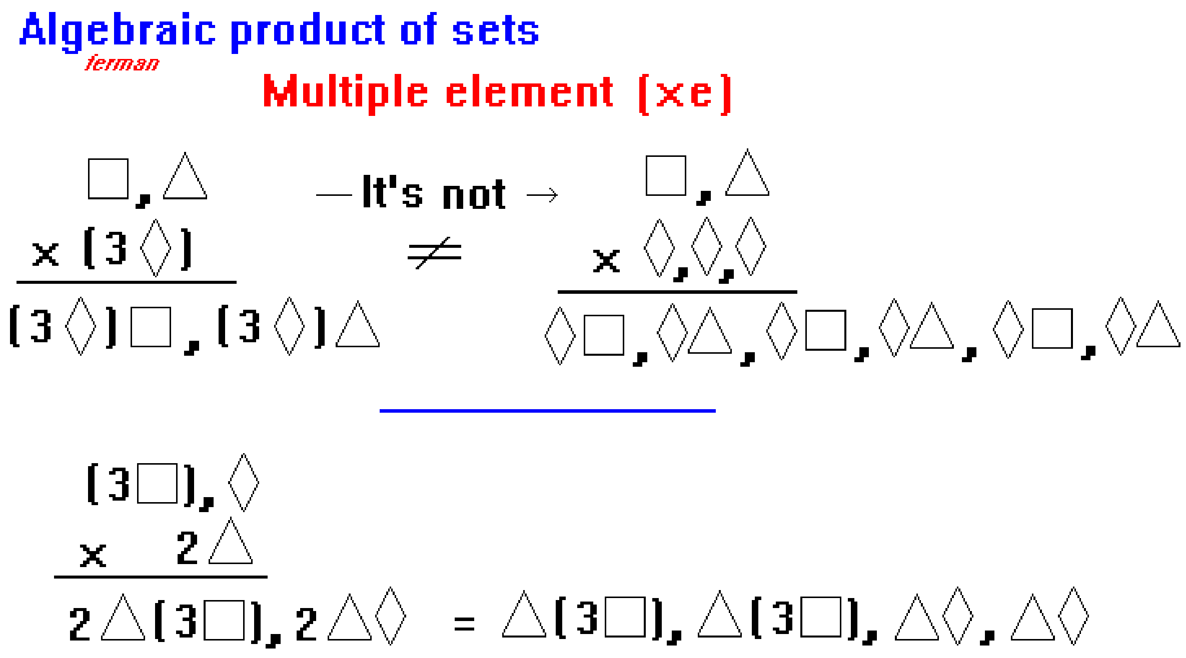
For this, we convert the separate 5 nails into a single element with 5 nails.

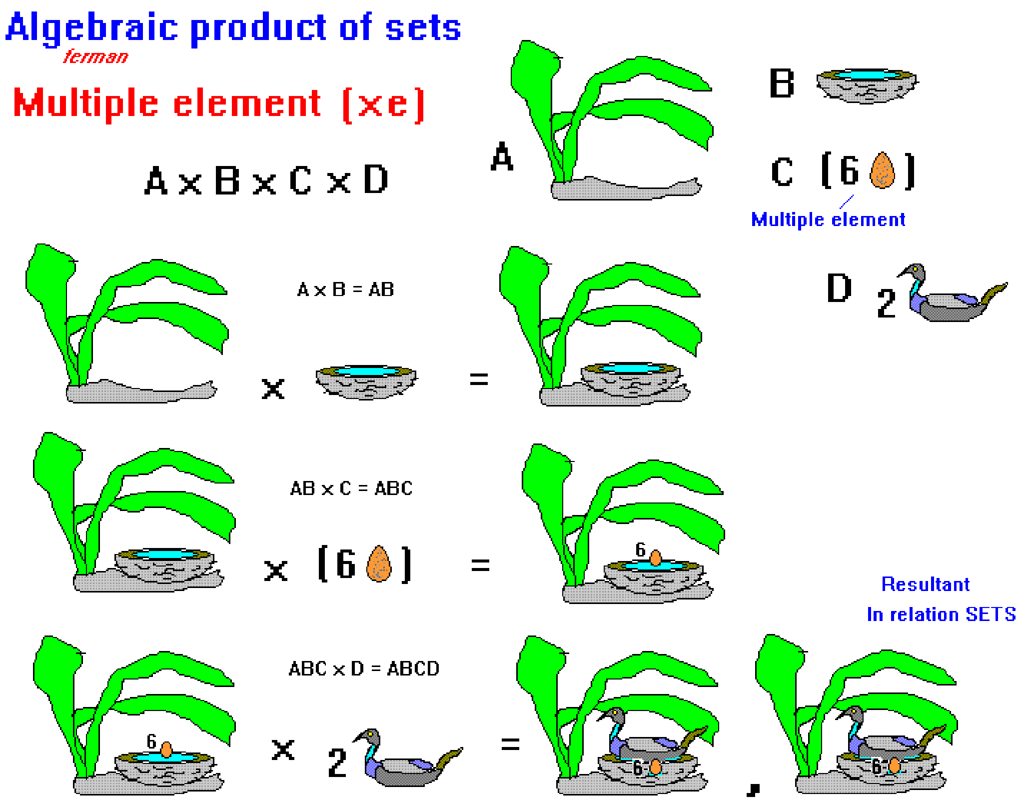
B ((5 nails))

And this way we can multiply the element wood by the element (5 nails)

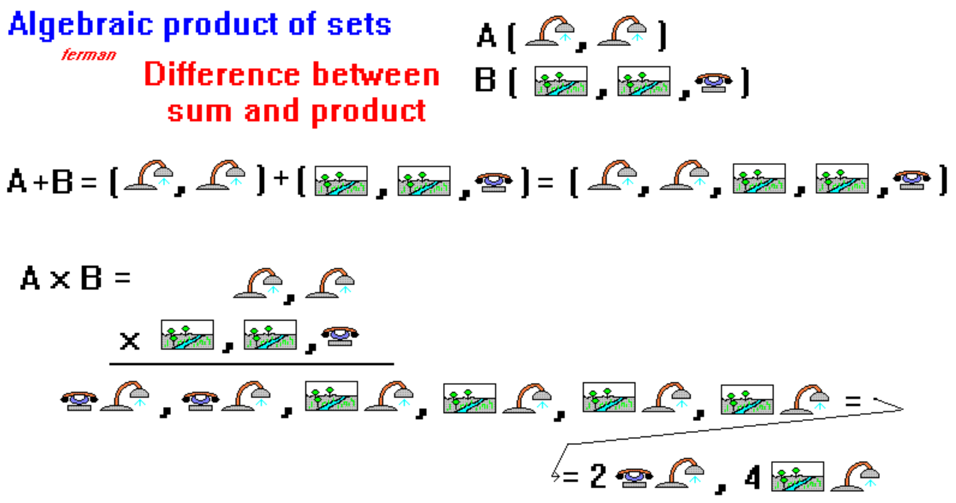
A (wood) x B ((5 nails)) = AB (wood-5 nails)

Let us the drawings.



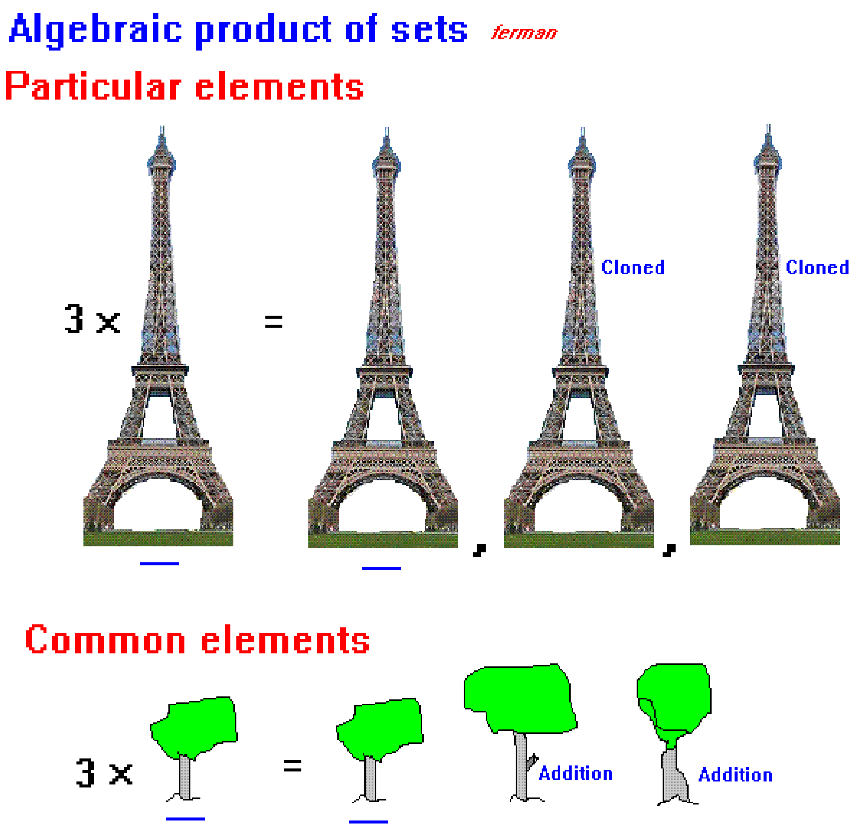


With the second drawing we can see as the product of sets can give us as result to sets or subsets of different Type, being sometimes Scrappily sets in which their elements don't keep any relationship among them, or as in this previous drawing, in which the resulting set can be a In Relation set, say, their elements have convergence among them.



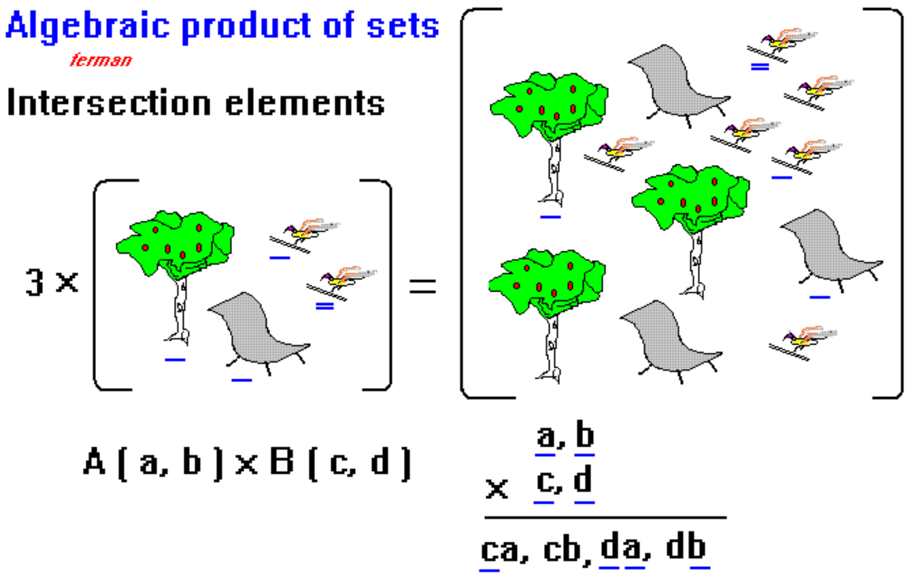
Addition and cloning of elements in the algebraic multiplication

In the sum, subtraction and division, the resulting elements of these operations were already in the primary factors of these operations, but in the algebraic multiplication an addition of elements that were not in these primary operative factors takes place.
If they are common elements, (for example pencils, rabbits, squares, roses, etc.) it is enough to look for new elements, introducing them to complete the resulting product.
Nevertheless, if what we want to multiply a concrete element, (for example, 3 x Einstein = 3 Einstein) then to the theoretical added elements we can denominate Cloned elements.
Therefore, we see that in the multiplication of set, we cannot make a clear correspondence between the resulting elements of the product and the elements of the factors to multiply, since in the product we have added and integrated new elements.



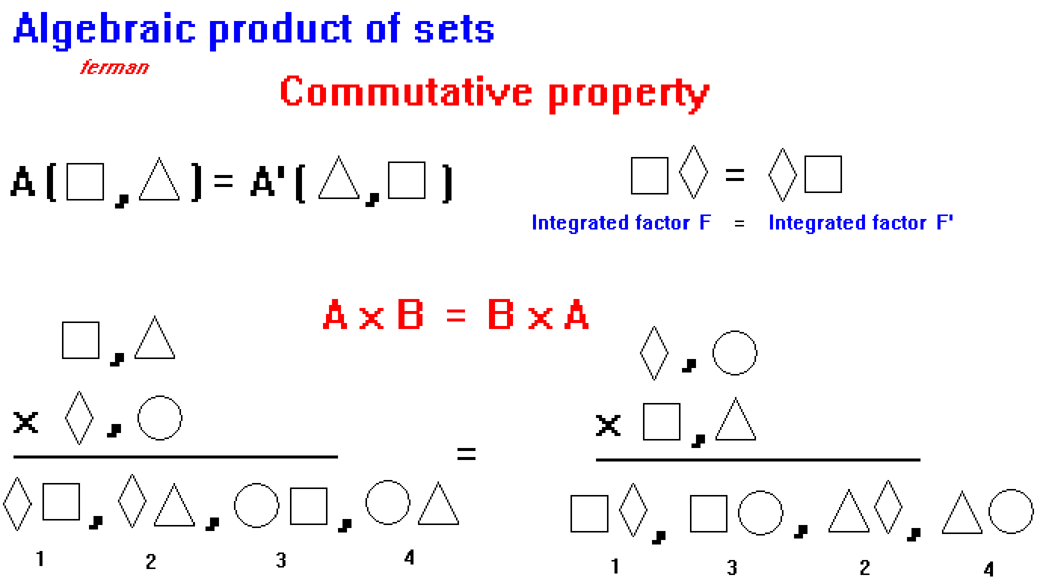
Intersection of elements among factors and product

In the algebraic product of sets, when having to introduce new elements from the exterior to be able to complete the product of the multiplication, some time we could need to know which are the elements that were in the factors to multiply and which are those that we have introduced into the product.
For it, we can use the intersection method of this theory, that is to say, to underline the elements that are at the same time in the factors and in the product, such as we can see in the drawing.



Let us remember the intersection of elements in this theory:
Given two sets A (a, b, c,) and B (c, d, e) we call intersection elements to those that belong to the two sets.
The intersection elements are expressed underlining them:
Given two sets A (a, b, <u>**c**</u>) and B (<u>**c**</u>, d, e) where <u>**c**</u> is the intersection elements that belongs to both sets.

Commutative property in the algebraic product of sets



By the moment we will consider that the algebraic product of set has the commutative property, and so that, as much the situation of the elements inside the set as the order of the elements inside the integrated factors follow this property.
A (a,b,) = A'(b,a) ; ab = ba

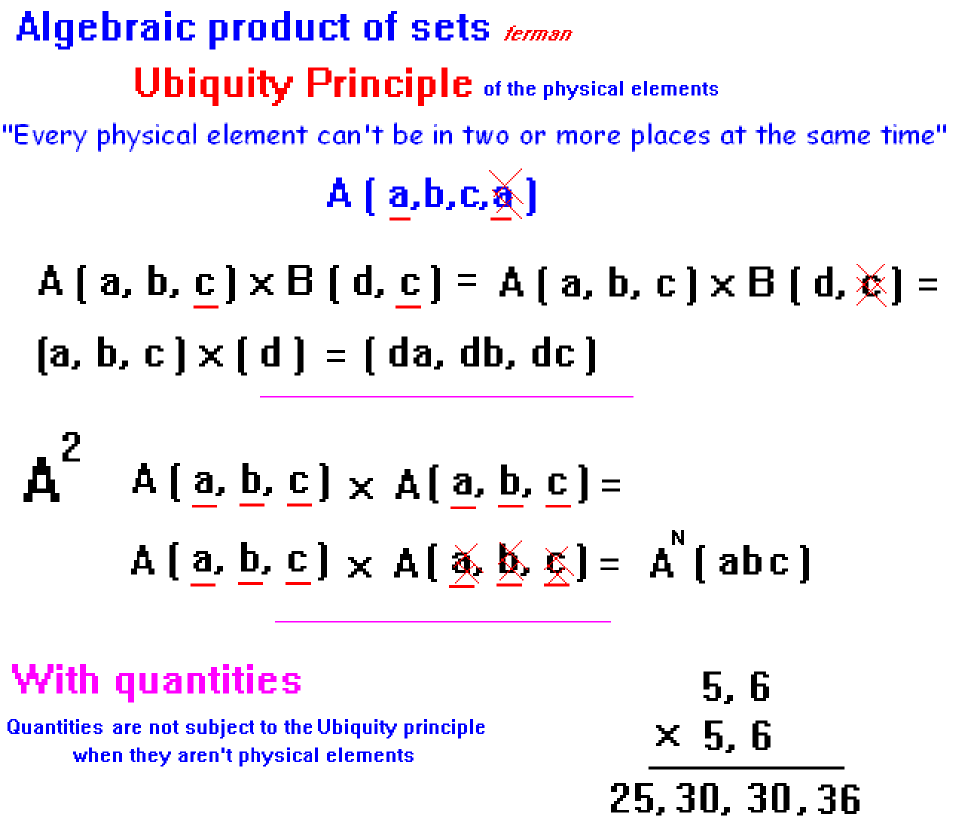
Ubiquity Principle.

As I have exposed several times, this theory on the physical elements tries to take mathematics of set to the reality of the physical elements and therefore the mathematical operations must to be subject the characteristics of these elements.
Now well, one of these characteristics is that a physical element cannot be at the same time in two or more different places.
Therefore we will take this definition for the Ubiquity Principle:

"No physical element can be at the same time in two or more places."

And of this consequence we can consider the following points:

1.-
No physical element can be repeated inside a single set.
Against, any physical element can belong to two or more different sets.
If any physical element were represented two or more times inside a set, we should consider it as a single element when operating with it.



2.- In the algebraic product among different sets where one or more intersection elements exist, these elements won't be able to operate on themselves, and therefore they will be kept inside alone one factor, preferably in the multiplicand.

A (a,b,c) x B (c,d,e) = A (a,b,c) x B (d,e)

This is due to a physical element cannot fuse with itself, and therefore, this physical element cannot multiply for itself neither.

In the case of the square (cube... N) of a set, the resulting product will be the fusion of its elements.

A (a,b,c) x A (a,b,c) = A^2 (abc)

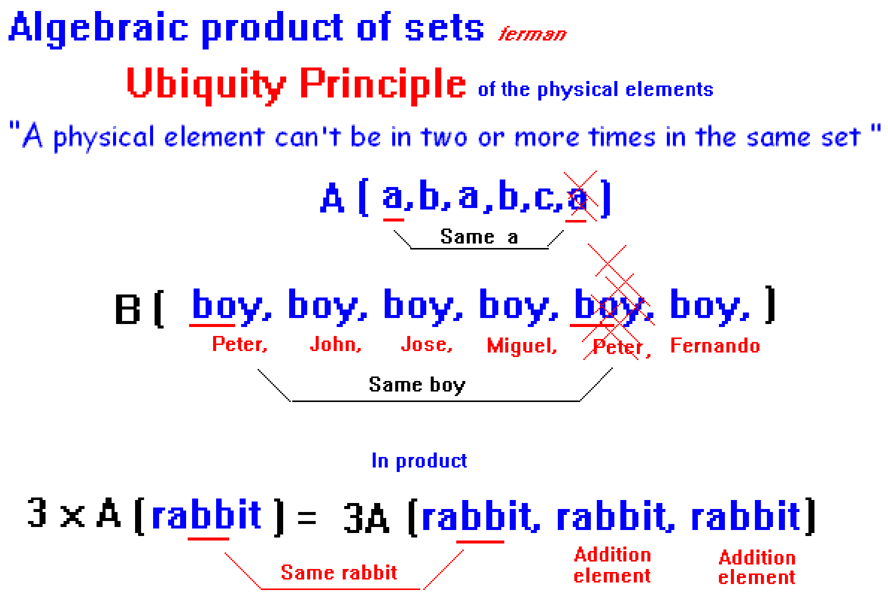
3.- A. - The Ubiquity Principle doesn't affect to numeric quantities since they are not physical elements.

A (2, 5) x B (3, 5) = AxB (10, 25, 6, 15)

B. - The Ubiquity Principle affects to the coefficients since if we eliminate the elements of a set, we also eliminate the multiplier coefficient.

A (2U, 3H) x B (2U, 2K) = A (2U, 3H) x B (2K)

Due to we have eliminated the elements 2U of the multiplier. (see 2.-)



Theory and practice reality in operations

It is logical that all the mathematical systems have as final purpose their utility and practical use, if that werenâ€™t this way, mathematics stops to have any sense.
And in the case of sets with more reason still, since we understand that the elements of sets have their consistency and physical reality, which is necessary consider when operating with them.
Because well, when seeing us subject for the physical reality of the elements of sets and as consequence this, many times it will be able to carry out practical operations with them but other times we have of conforming us with alone making it theoretically, because the elements of these sets not always allow us to manage them as we would.
For example, if we have in a shelving A several drink bottles A (5 whisky, 3 vodka, 4 gin) we can multiply perfectly the elements of this shelving for any number (i.e. 3) going to the warehouse, taking more drink bottles and stuffed the shelving until being able to make real the product of the multiplication, 3 x A (15 whisky, 9 vodka, 12 gin).
But if what we want is to multiply a set A (rivers of Spain) for a number (3), then it won't be possible of making it. Alone we can speculate about it with theoretical considerations.
However, this can be an advantage of mathematics when we can speculate and invent operations that are good to understand things, although we cannot take them to the practice.
Of course, mathematics is an exact science to which we must to demand rules of consistency, order, logic, and mainly, agreement and absolute absence of contradictions among their rules and foundations.

Division of sets by numbers.

Any set A can be divided by a number x (or function) occurring different results according to the demands that we put to this division.
Nevertheless here we only take in mind two types of divisions that I believe they are the most important:

--UNCERTAIN DIVISION
--CERTAIN DIVISION.

----UNCERTAIN DIVISION

To carry out an uncertain division of a set A by any number x, the only demand is that the number of elements or subsets of A is multiple of x.

For instance:
Given a set A (a,b,8,e,9,?,=,X,b), we observe that this set A has 9 elements.
This case, this number of elements (cardinal number) 9 is divisible by 3, for example.
Then we can divide this set A by the number 3, and we can represent this division this way:

A (a,b,8,e,9?, =, X,b) : 3

In this case the result would be three new resulting-subsets B, C and D with three elements each ones of them.
But the uncertainty of this division is due to here there are many solutions for each resulting subsets (A, B y C), since alone it is demanded they have 3 elements, but don't care which of they could be.
Therefore there will be many combinations.

For example:
B (a,b,8) C (e,9?) D (=,X,b)
B (b,b,a) C (8,e,X) D (= ,9,?) Etc.

----CERTAIN DIVISION

On the other hand for the certain division there will be many more demands, but it give us more complete mathematical results.
In the certain division it is demanded that in the set A (that goes to be divided by a number x), subsets of identical elements can be set and whose cardinal number in all these subsets is divisible for x.

For example:
Given a set A (c,c,a,a,b,b,c,c,a,b,c,c,b,c,c,b,c,b) that mathematically we can represent it as A (3a,6b,9c) and to which we want to divide it by 3, we can express it this way:

A (3a,6b,9c): 3 = B (a,2b,3c), C (a,2b,3c), D (a,2b,3c)

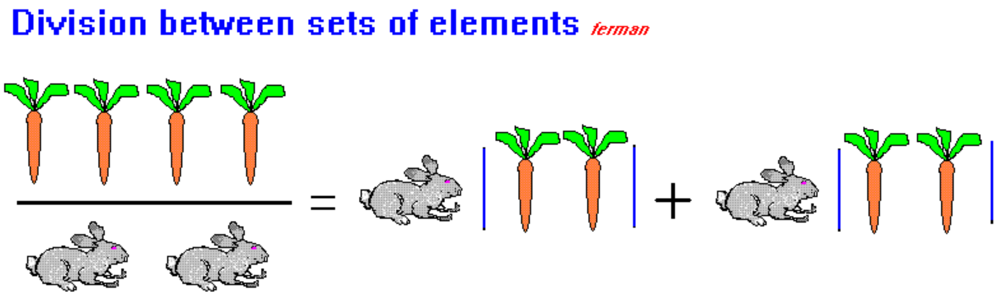
Here we observe an interesting solution: **in the certain divisions the resulting-sets are identical sets.**

Division between Sets of elements

This type of operation seems to be fine, and although the method and procedure of operating are the same ones than in the division of sets by numbers, in this case very interesting particularities are given.
The first particularity is when being the division of the elements of a set (A) between the elements of other one (B), the operation acquires DISTRIBUTION character.
This distribution character gives us the second singularity, which it is that in the resulting sets not alone they contain the distributed elements of A, but the elements of B that take and capture the elements of A.

Let us see an example to understand it better:
--Given a set A that is formed by 12 carrots, A (12 carrots) and a set B that is formed by 3 rabbits, B (3 rabbits).
If we proceed to the division (distribution) of the carrots among the rabbits, we will have that to each rabbit we give 4 carrots.
Therefore in the resulting sets C, D and E of this division we would have each rabbit next to its four carrots.

A (12 carrots) : B (3 rabbits) = C (rabbit, 4 carrots), D (rabbit, 4 carrots), E (rabbit, 4 carrots)



Therefore, in the divisions between sets, the resulting sets contain so much the elements of the dividend as to the elements of the divider.

As the divisions between elements or set of elements have special character, maybe it would be good to propose own names for the parameters of these divisions.
So at first, I would propose those of Dividend, Holder and Allotment.
-- Holder, because the divider elements have subject character and faculty of receiving dividends.
-- Allotment, because in these divisions the quotient has this allotment character.

In the divisions between sets we will consider also alone the types:

UNCERTAIN AND CERTAIN

As we have explained before the procedures in the divisions by numbers, now alone we see some examples to understand these proceeds between sets.
Example of UNCERTAIN division:
Given a set A (4, 7, 9, 0, 0, $) that is divided by a set B (a,b,c,).
We see this division alone can be uncertain because the division of the SIX elements of A between the THREE elements of B is the unique reasonable possibility.
But, as we saw in the divisions by numbers, this division can give us many solutions.
A (4, 7, 9, 0, 0, $) : B (a,b,c,) =
C (a, 0,0), D (b,4,7), E (c,9,$) or
C (a, 0,4), D (b,0,$), E (c,9,7) Etc.
Example of CERTAIN division:
--Given a set A (2,4,6,8,8,6,4,2,4,6,8,2) to which we want to divide it by a set B (a, b, c,).
In this case we observe that is possible to make a CERTAIN division since in the set A we can regroup their elements in subsets of identical elements 3x (2,4,6,8) that are divisible for the cardinal number of the set B (3) when having in A three subsets of identical elements and in B three elements also.
So, we can proceed to the division and we would have:
A (2,4,6,8,8,6,4,2,4,6,8,2) : B (a,b,c,) = C (a, 2,4,6,8), D (b, 2,4,6,8), E (c, 2,4,6,8).
Nevertheless in the division between sets of elements we don't always have as result to identical sets because the elements of the divider could be different, as in this previous case (a,b,c).

Exponentiations and roots.

Exponentiation

The philosophy of this theory is the one of respecting the integrity and peculiarities of sets and their elements when we operate with them.
For that reason always we cannot apply the whole operative potential of mathematics since in many cases we would destroy the identity of sets, also keeping in mind that sets are usually composed by physical elements and therefore their application field is the natural numbers.
It is more, when being integrated these elements inside well defined sets, because the operability is even more limited.
And this is the case of the exponentiations and roots in sets.
If for example we have a set that is formed by two pears A (2 pears) it seems clear that the complete exponentiation of the set A^2 could not proceed since we can't multiply pears by pears.
In this case we have to accept a middle exponentiation, that is to say, exponential alone the numeric factor of the set (2) conserving the characters of the elements to apply them as resulting characters.
In this case we could accept a exponentiation similar to this:

$[A (2 \text{ pears})]^2 = B (2^2 \text{ pears}) = B (4 \text{ pears})$

As we see we operate with the numeric factor and the class of elements is respected.
As example of exponentiation set we could put:

$[A (3 \text{ cars}, 4 \text{ bikes}, 2 \text{ caravans})]^2 = B (3^2 \text{ cars}, 4^2 \text{ bikes}, 2^2 \text{ caravans}) = B (9 \text{ cars}, 16 \text{ bikes}, 4 \text{ caravans})$

Roots

The roots are even more difficult of getting in sets, since in logic it we will demanded that all and each one of the existent subsets of identity has to have exact the required root.
As example, the following set would have square root:

A (25 cheeses, 16 hams, 36 beers)

Because the square root of each one of their subsets of identity (cheeses, hams, beers) has exact its square root. Therefore it would be:

Square root of A (25 cheeses, 16 hams, 36 beers) = B (5 cheeses, 4 hams, 6 beers).

Sets of multiple functions *f*m

Many times we can have any set (of elements and subsets) to which we want to subject to different operations according to the elements or subsets that it has.
For this case we can use the sets of multiple functions that can be applied to another set of real elements, applying different mathematic operations to the different elements and subsets of the same one.
A set of multiple functions is this way a set of operations *f*m in which the operations to which we want to subject to the elements or subsets of any real set are detailed.
Of course, the subsets that we want remain equally, because with not including them in the set of multiple functions it is enough.
As always, we see an example to understand all better.
Given a set A consistent in a warehouse of box of drink bottles that could be composed by:

A(30box whisky, 150box coke, 12box vodka, 200box rum, 5box gin, 3600box beer, 76box wine).

Now well, after several months of sales we have seen that we have to restructure the warehouse and for this reason we have made a study of the change that we have summarized in a set of operations *f*m that we will

apply (# apply) to the set A or warehouse.
This set of multiple functions to apply would be:

*f*m (whishy + 30, cokeâ€“80, vodka x 6, rum / 4, gin ^{2}, beers $^{-2}$), wine is correct.

Therefore the total expression of the operation would be:

A (30 whisky, 150 coke, 12 vodka, 200 rum, 5 gin, 3600 beer, 76 wine) # *f*m(whishy + 30, cokeâ€“80, vodka x 6, rum / 4, gin ^{2}, beers $^{-2}$) = B (60 whisky, 70 coke, 72 vodka, 50 rum, 25 gin, 60 beers, 76 wine)

We see here that the square root is puts as $^{-2}$ (beers^{-2}) but you can opt for any systems of signs.

Complex sets Ac

The complex sets as for their class and determination of their component elements will be those in that certain difficulty exists to expose them or to explain their identity with alone the conventional signs, that is to say, it is necessary wider exhibition of the peculiarities of these elements than the one that we can put inside the parentheses of any set A.
For example:
If we have a set A, composed by:
--Apples; immature, with weight between 100 and 120 grams, of rosy colour and without seeds.
--Tomatoes; mature, small, lengthened and juicy.
--Cucumbers; yellow, without seeds and of medium size.
In such a case it would have some difficulty to express them appropriately inside the parentheses of that set A.
Although you could express A as a set of complex class (Ac), dating to the different types of elements with numbers or letters to operate with them.
Later, apart from the mere expression as set, we would detail the class of each type of element of the some ones:
Ac (a, b, c,)

a.- Apples; immature, with weight between 100 and 120 grams, of rosy colour and without seeds.
b.- Tomatoes; mature, small, lengthened and juicy.
c.- Cucumbers; yellow, without seeds and of medium size.
It is similar procedure that is used in algebra when we substitute numeric values for letters.
In this case, we could operate mathematically with them and later we can look and study the real elements of the set.
Ac (to, b, c,) x 4 = Bc (4a, 4b, 4c)

Characteristic of the operations with sets

As we have seen previously, the operations with set have each one of them its own peculiarities.
By the moment, and until we study the different properties of each operation, we will make a simple revision of their operative differences.

Sum
In the sum we can operate with set of elements of different types. This way we can sum a set (equal) formed by 5 apples with other set (equal) formed by 8 oranges and we will obtain a set (homogeneous--fruits) formed by 13 fruits.

Subtraction.
In the subtraction we see that to any set alone we can subtract it part of their elements, but not to subtract it numbers, neither other elements that don't have.
This way to the previous set of fruits (13 fruits) we can subtract it some of them, for example 4 apples and we could obtain different types of subsets, as in this case a subset formed by 1 apple and 8 oranges.

Multiplication
We have seen that we can multiply any set by numbers, but not by other set.
We can multiply this way 6 carrots for the number 4 obtaining a new set formed by 24 carrots.
But we cannot multiply the 6 carrots for 4 pears because we don't obtain a real product.
Neither we can multiply the 6 carrots for 0, since zero is considered as an empty set and at the same time it seems logical that if we have 6 carrots that are real, we cannot make disappear when we multiply them by 0.

Division
The division has a wider operation spectrum and we can divide sets by numbers or set by other sets.
This way, we can divide 60 euros for the number six, and we can also divide 60 euros among six people.
Therefore we can divide any set of elements among other set with same or different elements.
This even takes us to divide empty sets among themselves or among another type of sets.

Although, we must maintain the property of division that have as reference to the unit (1).
This way if we divide 4 by 0'01 (4/0'01= 400) the result say us that it is to the unit (1) to that correspond 400, but not to 0'01.
* * * The operations with empty sets can be seen at the end.

Composition of Sets and Supersets

We have already seen in the definition of types of sets that in the relation and fusion sets some ordination, cohesion and convergence among the different elements exist, question that gives these sets their structure and special composition.
We have also seen as with this ordination and definition in sets, we could even date them with their characteristic noun as physical or mathematical bodies.
For example, in the relation sets we could have: Box of bottles; soldiers' company; numeric representation of any sum, multiplication, etc.; words and phases; posts of illumination of a street; placed figures in a chessboard; etc.
The same, in such fusion sets as: clock, automobile, dog, tree, building, etc.
In these cases and to be built, their elements have had to suffer a joining process or composition and once gotten this joining process a new set has been gotten with their own characteristic and even in most of cases with its own noun that can define this group.
Therefore here we see that when we unite elements to get a set or when we unite sets to form supersets, with this union the resulting set have acquired new properties and characteristic and even a specific noun as set, and therefore, its own identity.
In such a case, to this type of union with specific results is to what we will call COMPOSITION, because we understand that, besides the properties of each element or subset, it is the method and composition system what gives to the new set its own peculiarities.
Due to it, another important factor that is born in these joining procedure and composition is its own qualification and definition as composition process.
We see this way in compositions that in many cases these procedures also acquire their own verb (noun, etc.) descriptive of the used procedure.
This way if we catch the pieces of a clock and we unite them to get the clock already finished, we will say that we have ASSEMBLED the clock; if it is a house what we have gotten uniting their elements, we will say that we have BUILT a house; if we have united two cans of paint to form a new colour, we will say that there is MIXED two cans of paint; if in the earth, the nature through time unites chemical elements transforming them, developing them and along of this it gets vegetables and animals, we will say that ours planet has EVOLVED the life; etc.
Therefore in the processes of composition of sets, we distinguish processes and specific solutions for many of these resulting sets, which would be mainly:
--- Noun of composition (own, common, specific, etc.): Building, tree, automobile, sea, etc.
---Verb, noun etc., **of the used procedure**: Assemble, build, mix, combination, reaction, evolution, etc.
We see the mathematical study of set unites, explains and belongs together with many linguistic terms, and that therefore, mathematics goes parallelly and it is an explanation and expression language of the physical and natural reality of things.

Static sets and dynamic sets

Connecting with the compositions of sets we will see some new concepts on them that will show us the parallelism and equality between the mathematical sets and the physical bodies; between the properties and behaviors of some and the other ones.
If for example, and leaning on in the sum and composition of sets, given three groups:
Set A formed by five pots A(5 pots)
Set B formed by a heap of appropriate earth to plant B (some earth)
Set C formed by several floral seeds, C (some seeds)
Subsequently we proceed to unite these tree sets, composing five floral posts with their corresponding seeds already SOWED (procedure noun).
Then we see that we are gotten the sum and composition of a new superset, AuBuC (five floral ports)
Now then, at first and before the seeds bud, this set of five pots could be considered a STATIC superset.
But if now we allow the passing of time, we will be able to see as some time after the seeds of these pots begin to bud and later on, to produce their flowers.
At this time we will begin to notice that the set that seemed totally static is not really this way and with time and the particularities of its elements, this set has become a DYNAMIC set. It changes its identity.
Therefore, we can get the conclusion that would be:

DYNAMIC, any set that goes changing its own characteristics, convergence or identity with the course of time.

With it, and as I said before, we also can understand the laws and physical behaviours of the elements by means of the study of the physical and mathematical set.
In next amplifications we will also revise some concept of sets, as it can be the speed of transformation of the dynamic sets.
The examples of dynamic sets are infinite in the nature, as we can observe:

---Any chess match where the pieces change their position; they can be are exchanged among them and also they go subtracting and disappearing of the table, etc.
--- A pond with fishes where continually they change their positions, and where some can even eat to other ones.
--- A race of cars or horses.
--- A sun with their planets, comets, etc. rotating to its surroundings; the satellites rotating around the planets.
--- An anthill where each ant moves and can make transform the anthill.
--- A warehouse where the merchandises enter and leave continually.
--- The climatic processes where each element moves, changes and can make change to the other ones.
--- The forests where trees and animals grow and die continually.
Etc.
That is to say, the physical sets have enormous potential of change and transformation.
Therefore we can say nature itself is an enormous and dynamic set, which in turn it is formed by other many dynamic subsets.

Sets and Chaos

In my model of Cosmos I explained that we can consider in chaos two different considerations:
The objective or real chaos.
And the subjective chaos for each person.
The objective chaos would be when it is studied the interrelation of elements or sets from a mathematical point of view by mean of comparing these elements o sets, analysing and observing their differences.
And the subjective chaos would be the one that each person has due to its knowledge and personal circumstances.
However for a study in the most impartial way possible, the convenient thing is to arrive at the acceptance of chaos in a general and mathematical way that can be comprehensible widely by people.

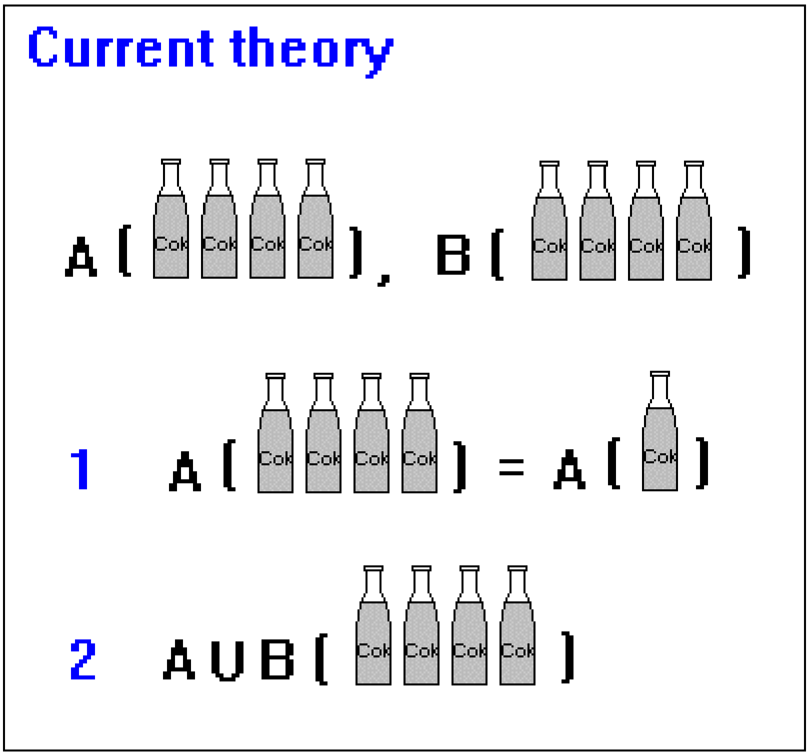
In this case, chaos corresponds and can be understood very well with the study of sets, their peculiarities and their compositions.
This way if we observe the types of sets, we see that chaos would be located near the scrappily sets, that is to say, near of those that don't have any type of cohesion or relationship among its elements.
Sets without convergence among their elements.
Against, if we observe the fusion sets, we see that here we can't appreciate any type of chaos.
In this case, sets have very convergence and order among their elements giving them a lot defined composition. Nothing to do with chaos.
Therefore chaos, its consideration and definition is closely related with the consideration and definition of the types of sets:
Chaotic-Scrappily sets; Non chaotic-Fusion sets.
We could say they use parameters and parallel solutions.
On the other hand we see as in the chaotic sets the magnitude of chaos has a direct relationship with the motion of their elements.
If we observe the bees of a honeycomb when it is very cold, we see the bees hardly can move, and in this case we find their behaviour not very chaotic.
Nevertheless when they warm with the sun, they begin to move quickly and the honeycomb becomes an authentic chaos for our point of view.
So we can check that the dynamic potential (or motion and change) of any set is directly proportional to its chaotic potential: When more motion--more chaos.
At the same time we remember that the index of convergence of the elements of any set is also a measure parameter and appreciation of its chaotic potential.
Then we can say that:

"The convergence index (Ic) is inversely proportional to the chaotic potential of any set, while its (Pd) dynamic potential (motion of its elements) is directly proportional to the chaotic potential of this set."

SOME DIFFERENCES WITH THE CURRENT THEORY OF SETS

INTERSECTIONS AND LIMITLESS NUMBERS OF EQUALS ELEMENTS

As I said before, I estimate that my theory is complementary and it doesn't have reason to try to substitute to the current sets theory.
However there are some contradictory viewpoints, and in this case maybe my viewpoints are more interesting than of the current theory.
I am referring to the consideration and acceptance of infinite equal elements in my theory, while the current one considers that a unique element for each specie exists.
The current theory and the consideration of unique elements have rather theoretical consistency, suit to inhabit in the thought of mathematicians almost exclusively, but their consistency collapses when we try to take it into the physical reality of the elements.
Their fields of application is also very narrow because it is devoted almost exclusively to speculate on families, groupings, etc. of elements, but it doesn't advance in the sense of the interrelation, evolution, transformation, etc. that the real physical elements really has.
The incongruence of this theory when we take it to the physical reality of the elements would be demonstrated with a simple example.
Later on, we will see the intersection method according to my theory of sets.
In the following drawing you have an example of equality and union of sets in the current theory, with which the discrepancies with my theory can be showed:



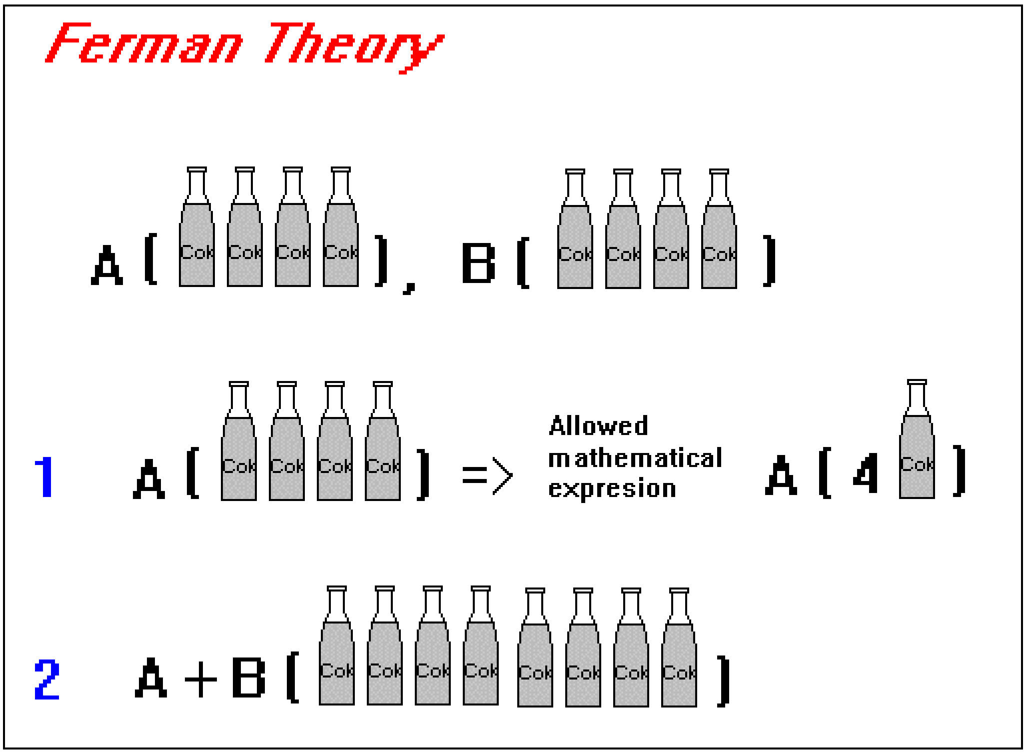
In this previous drawing we show two sets A and B, each one of them formed by 4 bottles of beer or coke. According to the current theory (in 1) when being equal the four bottles, then the A set (with four bottles) can be equal to the same A set with alone one bottles.

This happens for not considering the physical reality of the elements, but their simple appearance.

In (2) the union of A and B would give us another superset AuB also formed by four bottles for the same reason, that is to say, to confuse physical reality with physical appearance. If they seem same, then they are the same ones.

In my theory the appearance doesn't care, what we have to take in mind is the physics of the elements.

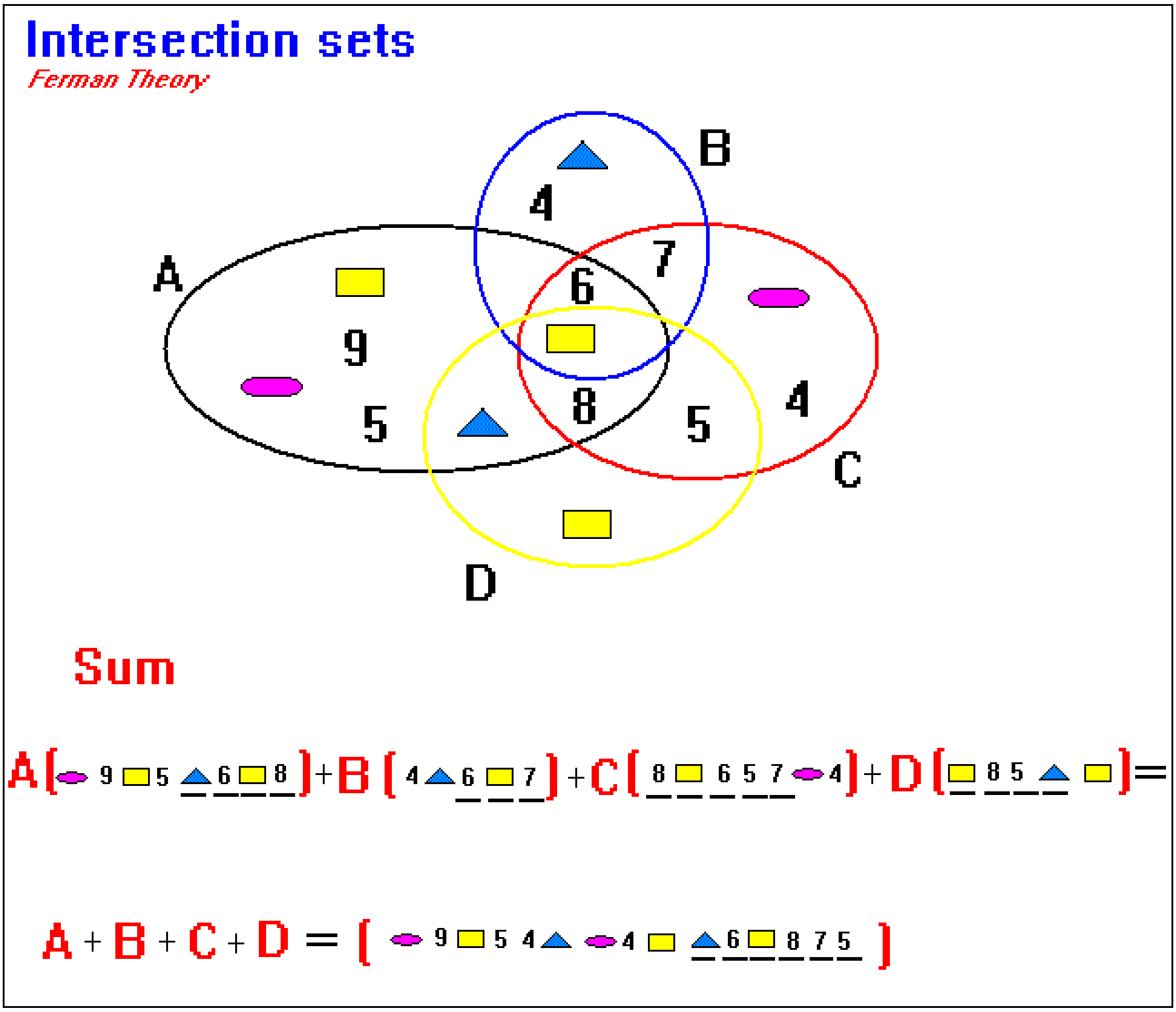
If there are four elements in a set and four in other, although they seem similar, they really are other physical elements.



In the previous drawing it is seen that a set A with four bottles it is not equal than the same set A with alone one bottle.
Now then (in 1) you can represent mathematically the set A with a number that represents the quantity of same elements that there is in the set and later the specification of what class of elements it have A (4 bottles).
But it is not a real representation, but a representation or mathematical adjustment of the elements that have the set A with object of being able to use it more easily to different mathematical operations.
Then in (2) we see a sum of the set A (4 bottles) + B (4 bottles) that will give us as result A + B (8 bottles) that is the real sum of the elements of A and B.

Intersections

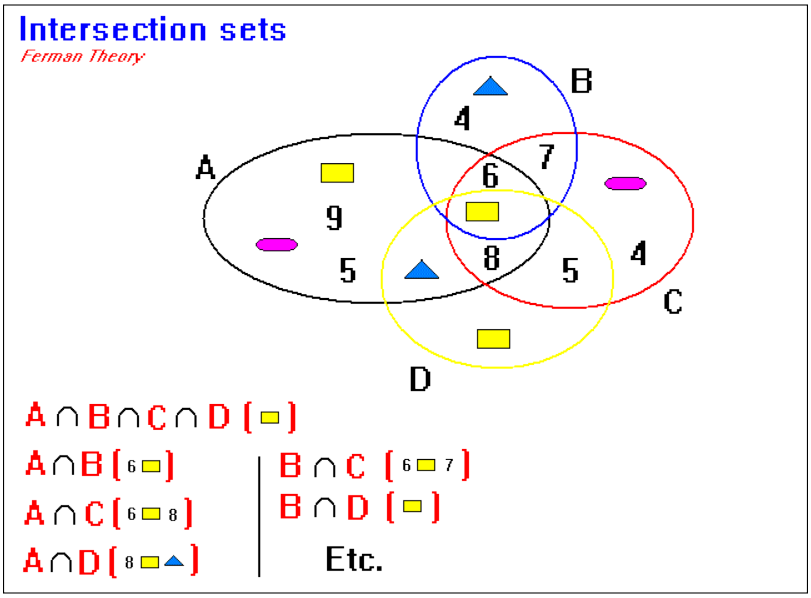
As for the intersections among sets, it is also necessary to keep in mind their physical reality and not their appearance.
As it is not the appearance what it cares, and many similar elements can exist in sets of intersection, for distinguishing each element we should point out (for instance, underlining them) those that are repeated representation due to they are already in another group with object of not to confuse them operating repetitively with them.
It is shown it in the following drawing:



In the previous drawing, we see that it can have repeated elements (rectangle, triangle, 5, etc.), but for that reason and for not confusing the elements of intersection of each set, we should point out the intersection elements.

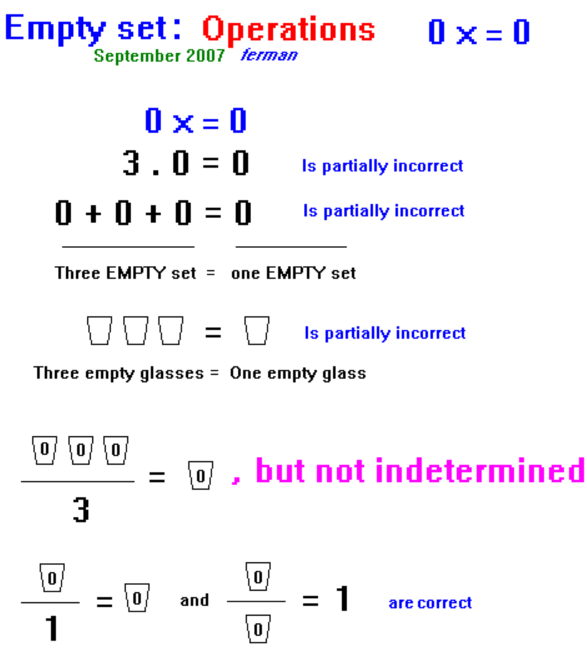
To make the sum of all the elements, we must translate all and each element to the new superset, without repeat any of them when they are sets of intersection, but putting all them although they can be similar.
In the previous drawing, we underline the intersection elements (to sum them alone one time).
In the result we see that repeated elements exist (rectangle, triangle, etc.), because although their resemblance was total, however really there were more than a rectangle, triangle, etc. in the sets to add.

Now then, the base and way to adjust and express the intersection elements among sets are the same one that in the current theory, as well as the signs and expression formulas.
The unique thing that can vary in some case is when it can have repetition of similar elements that it is necessary to include all then, not eliminating the apparent ones as in the current theory.
So, in the below drawing we have as the intersection elements and their form of expressing them it is the same one in general.



Operation with empty sets.

The empty set is a set without elements that can be represented by the zero (0), but it continues being a set that can be subjected to the operations of set.
Therefore we can say "zero (0) is essentially the empty set."



When we operate with empty sets, we usually look on (simple and exclusively) the result of their component elements to which we date as zero when having none.
But we forget something essential, and it is the number of empty sets with which we are operating.
If, as in the drawing, we take an empty glass to which we multiply by 3, the real result will be we have 3 empty glasses, but the partial result will be we have zero elements in these 3 empty glasses.
So, in this case we adjust as result ALONE THEIR ELEMENTS, but we forget we are USING A SERIES OF SETS.
Although this operation method is of great importance due to we later use this property as principle, base and justification of other operations, as can be in division.
And clear, when taking as principle and explanation to a partial result and not to the total result of the operation, because we end up accepting principles of indetermination that are not correct.
For example, if we put 1x0 = 4x0 we are accepting that both terms are identical, when they are not because in the first term there is alone an empty set and the second term there are four empty sets, although the number of component elements is same in both term of the equality.
This way, when we operate (3x0 = 0) we should accept that we are operating PARTIALLY and alone with relation to the elements of the empty sets that we are using.
In the same way we should accept that this operation is PARTIALLY UNCERTAIN, since three empty sets cannot be the same thing that an empty set.
For this same reason we cannot use this type of postulates to conclude that 0/0 are an uncertain operation, since their solution is 0/0=1 abiding to the properties of the division.

Representation of Empty set:

September 2007 *ferman*

In pure mathematics	In mathematics of sets
$4 \times 0 = 0$	$4 \times 0 = 4.\bar{0}$ Four empty sets
$6 \times 0 + 0 + 2 \times 0 = 0$	$6 \times 0 + 0 + 2 \times 0 = 9.\bar{0}$ Nine empty sets
$21 \times 0 - 6 \times 0 = 0$	$21 \times 0 - 6 \times 0 = 15.\bar{0}$ Fifteen empty sets
$\frac{21 \times 0}{3} = 0$	$\frac{21 \times 0}{3} = 7.\bar{0}$ Seven empty sets

Indefinite Sets.

The indefinite sets can be considered as a form of the complex sets where A(X) represents to an indefinite or known set in that moment.

Indefinite sets. A(X) Conjuntos indefinidos

ferman Oct. 2007

— Operations —

$$y = \frac{x^2+3}{4} \cdot A(X)$$

If / Si $x = 5$ $\quad y = 7 \cdot A(X)$

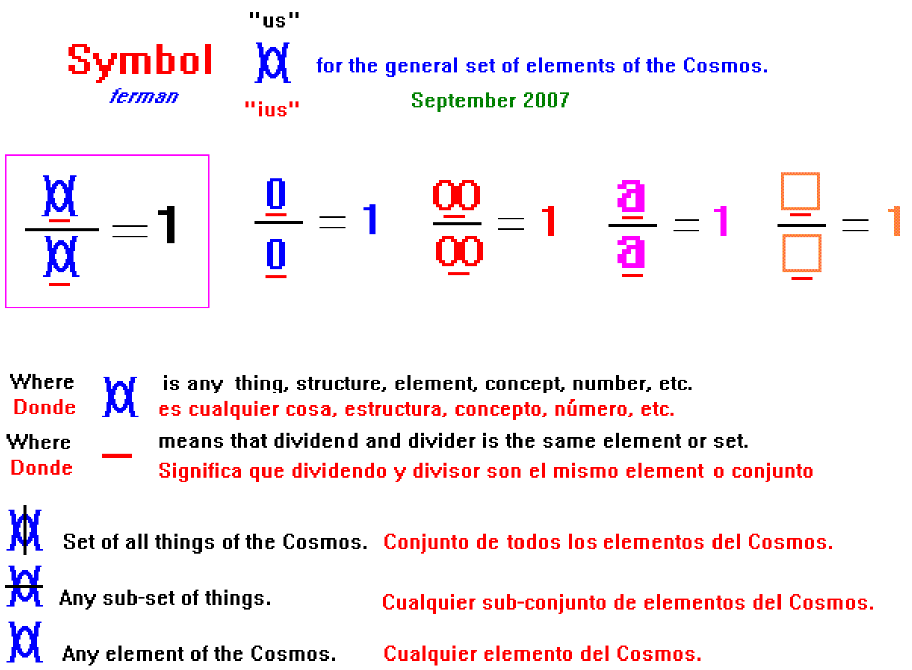
$7 \cdot A(X)$:

- $X = 0 \quad y = 7 \cdot \bar{0}$
- $X = \infty \quad y = 7 \cdot \infty$
- $X = 6 \quad y = 42$
- $X = \square \quad y = \square\square\square\square\square\square\square = 7\square$

This way A(X) it is a set that we don't know its elements or they are not very defined, but that we want to operate with it.
In this case we consider in principle to this set A(X) as to a unitary set, that is to say, of a known single element, but that once we have carried out on it the operations, we can discover the reality of this set A(X) to proceed to its final resolution.
This type of operations of sets is good to operate with all type of elements, as they can zero, infinite, a square, a group of animals, etc. (drawing)
Therefore here we proceed firstly to carry out the operations and later to know the content of the set A(X) to apply it the resultant of the carried out operations.

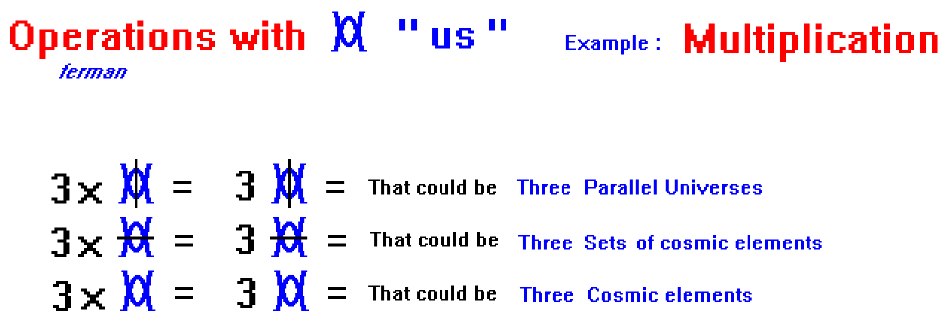
Symbol of set, subsets and elements of the Cosmos.

As I understand that the total set of Cosmos' elements doesn't have any symbol, then I propose the symbol IUS for the set of all the cosmic elements, with some differences for subsets and elements, which can be uncertain or unknown at first.

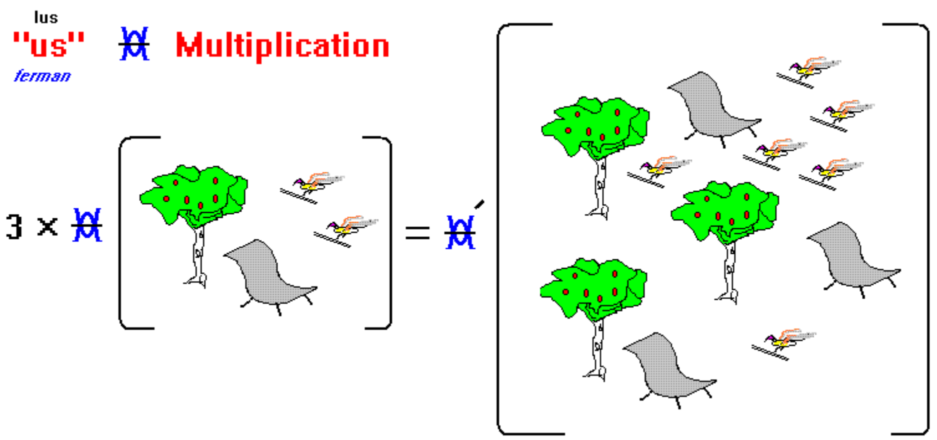


Operations

As we can see, to the sets or elements "us" (U|, U, U) we can subject them to any operation like to any other sets.
But, these sets o elements can be ignored (or not) by us previously.
This way, we can have a known element U that can be a pencil; or we can ignore previously that this element is a pencil or another one element.
Anyway we can operate with them, and later we will already see if we can discover the class of element with which we are operating.
We can see this in the example of the drawing:
3 x U = 3U where U can be a well-known or unknown element.



An example of multiplication of "US" U sets



The product of any number N by a set of elements "us" U gives us as result to another set U' that contains N times to each one of the elements of the multiplication.